INVENTION REPORT APPENDIX

TITLE OF THE INVENTION: INPUT METHOD FOR POCKET-SIZE TERMINALS

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1. BACKGROUND OF THE INVENTION

This invention is an input method for pocket-size terminals.

2. THE PROBLEM

A pocketable device should be small but the display should as large as possible. This method minimizes the space needed for the input controls, thus maximizing the size of the display.

3. PRIOR ART SOLUTIONS

The best solution so far is using a touch screen and a stylus, as in PDAs such as the Palm.

4. DRAWBACKS OF PRIOR ART SOLUTIONS

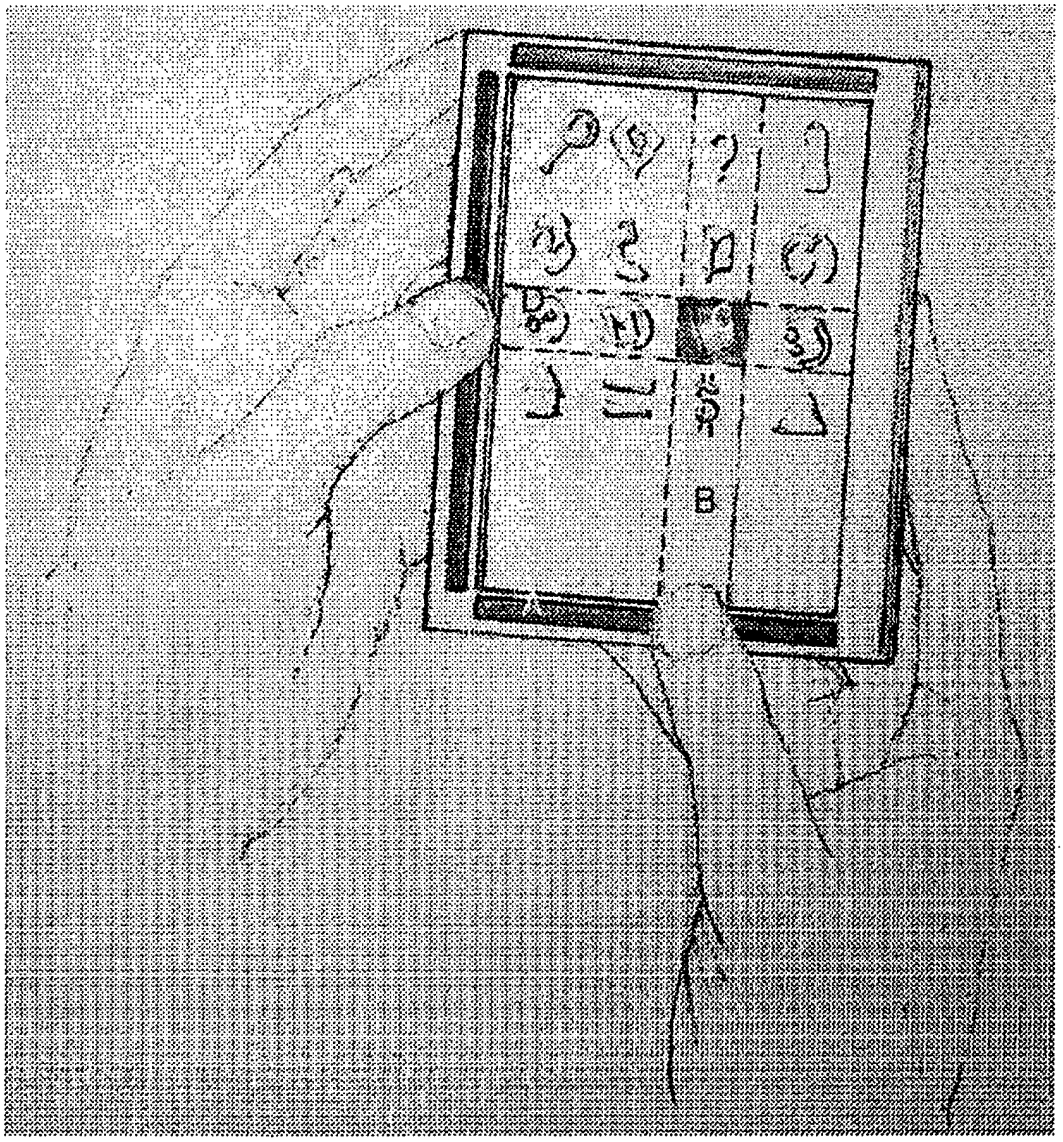
- A stylus-controlled device will need buttons anyway for one hand operation, if it is to be used as a phone.
- A touch screen weakens the image quality of the display. This will be more noticeable in the forthcoming reflective colour displays.

5. ADVANTAGES OF THE INVENTION

- Easy to learn
- Hard buttons, soft buttons, pointing, clicking and dragging are possible with same input device
- One hand operation of critical phone functions is possible
- A scaleable user interface is possible for the soft buttons
- No touch screen or stylus is needed
- Space taken by the input device is truly minimal
- No mechanical parts

6. DESCRIPTION OF THE INVENTION

Force and position sensitive sensor strips (A) are placed on three sides of the display as in the illustration below.



There are three input modes:

1. Pointing mode

Pressing the strips lightly will cause highlight bars to emerge across the display (B). Pressing either of the strips harder will activate the item in the intersection of the highlight bars (C). Alternatively activating could be achieved by lifting either finger. In this case the sensor strips would only have to be position sensitive.

It should be noted that in the actual device highlighting can be accomplished in a much more subtle and aesthetically pleasing way than in this illustration. Alternatively only the intersection may be highlighted.

Pointing mode can be used for e.g. writing with a soft keyboard. Writing this way is actually much easier than it sounds. Thorough writing speed tests with test subjects will be made in the near future and the results will be made available to interested Nokia parties

The pointing action itself with this principle is easy and fast. The bottleneck in writing with a soft keyboard is often finding the next letter to be written. I propose that a soft keyboard will be easier to use if the letters are visually grouped into, say, groups of 3x3 letters. This will help the user memorize the locations of letters and helps visual search.

Incidentally, this pointing method is well suited for writing Japanese. The Japanese Kana soft keyboard is arranged so that each column represents one of the consonants and each row represents one of the vowels. For example, the character for syllable "ki" would be written by selecting k-column and i-row.

2. Soft button mode

If only one of the strips is pressed, the item nearest to the pressing point will be activated. In the situation of the illustration, lifting the right hand thumb and pressing only with the left hand thumb would active the item marked with D. This allows one hand operation in critical phone functions, if their icons are placed along the margins of the display.

3. Hard button mode

Often used commands can be printed directly on the cover of the device along the strips, thus saving screen space (This idea by Miika Silfverberg, NRC/Helsinki).

Having three sensor strips allows the device to be used by right and left handed people with equal ease as well as using the device in both "portrait" and "landscape" positions. Switching between landscape and portrait could be accomplished with a gravity sensor or a button press.

7. THE ALTERNATIVES

There are resistive position and pressure sensitive sensor strips on the market. They can have a resolution of at least 1 mm. Alternatively a position sensitive strip could be placed on a mechanical switch. This would afford a sensory feedback of clicking. Other solutions for sensor strips might also come into question.

If the resistive sensor consists of two layered bands of resistive material which make contact at the point where pressed, the resistances can be alternately measured from both sides of the point of contact. This way the position of the center of the pressing finger could be deduced. When accurate pointing is

required, the user first slides (or places, as the pointing is absolute) her thumbs to the approximately right positions. Then she can fine-tune the position of the cursor by rolling her thumbs sideways along the sensor strips.

8. USAGE - PUBLICATION

At present there are no plans for the invention to be used, marketed or made public.

9. PROJECT AND BUSINESS UNIT

At present the invention does not belong to any project. NMP might find the invention useful. My suggestion for a person suitable for giving a statement of the invention is Miika Silfverberg (NRC/Helsinki).

10. KEYWORDS

Input method, PDA, pointing, text input